Claim 27. A polycarbonate resin composition according to claim 1 consisting essentially of (A) about 100 parts by weight of a thermoplastic polycarbonate resin as a base resin, (B) about 2-20 parts by weight of titanium dioxide, and (C) about 0.01-5 parts by weight of a sulfone sulfonate salt wherein the polycarbonate resin is non-bromine polycarbonate resin.

Claim 28. A polycarbonate resin composition comprising: (A) about 100 parts by weight of a thermoplastic polycarbonate resin as a base resin, (B) about 2-20 parts by weight of titanium dioxide, and (C) about 0.01-5 parts by weight of a sulfone sulfonate salt and further comprising an olefin polymer impact modifier prepared by polymerizing at least one olefin monomer selected from the group consisting of ethylene, propylene, isopropylene, butylene, and isobutylene and grafting maleic anhydride onto the olefin polymer.

REMARKS

The specification and claim 3 have been amended to correct a typographical error in the units of measurement of the particles titanium dioxide. It is well known in the art, as shown by the references cited by Applicant and the Examiner, that the appropriate unit of measurement is μm and not mm.

Claim 1 has been amended to recite that the parts of (B) and (C) are based on 100 parts by weight of (A). Support for the amendment is on page 5, lines 3-4 and lines 25-27. Claim 23 has been replaced by new claim 28. Claims 25 to 27 directed to specific embodiments of the invention have also been added. Basis for the use of a non-bromine polycarbonate is found in U.S. 5,837,757 which was incorporated by reference into the present application. No new matter has been added.

Applicants enclose a Credit Card Payment form authorizing payment of the additional fee for the claims added by this Amendment.

Status of the Claims

Claims 1-28 are pending and under consideration. Claims 25 to 28 are added by this Amendment. Applicants note with appreciation that claim 23 would be allowed if placed in independent form. The subject matter of claim 23 is now in claim 28.

Statement of the Rejections

Claims 1, 4-13, 16-20 and 24 rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the Rosenquist et al. The reference discloses aromatic brominated polycarbonate/polyester carbonate/silicone polyimide compositions containing a metal salt of a monomeric or polymeric substituted aromatic sulfonic acid and a filler or pigment. It is noted that sulfone sulfonate salts are not disclosed among the sulfonic acids which are suitable for use in the compositions of the reference (col. 6, line 57 to col. 8, line 12). However, potassium diphenylsulfone-3-sulfonate (KSS) is used in Comparative Example A to show that KSS does not give the same results as sodium-2,4,5-trichlorbenzenesulfonate which is among the sulfonic acids disclosed as suitable for the compositions of Rosenquist et al.

Comparative Example A also contains 40 parts of a brominated polycarbonate, 10 parts of polycarbonate, and 1.5 pph titanium dioxide. The Examiner has taken the position that "about 2 parts" is readable on 1.5 pph or, in the alternative, "1.5 so close to 2 that one would expect them to have the same properties".

Claims 1-14, 16-22 and 24 stand rejected under 35 U.S.C. 103(a) as unpatentable over Ishii et al. in view of Kirsch et al. or Japanese published application No. J 2000302959 (J'959).

Ishii et al. disclose blend of polycarbonate, an organic sulfonic acid metal salt, PTFE and grafted rubber. In example 3of the reference, KSS is used as the sulfonic acid metal salt. The reference generally discloses the use of a number of additives including pigments but does not specifically name any pigments. Kirsch et al. disclose the use of titanium dioxide to raise the tracking resistance of polycarbonate compositions. Sulfonic acid metal salts are not disclosed in Kirsch. The Examiner cites J'959 as disclosing that titanium dioxide "whitens and rates the reflectance" of polycarbonate. The Examiner has taken the position that "[I]t would have been obvious to add titanium dioxide to Ishii's composition for the expected advantages".

Claims 1-20 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over the J'959 in view of Mark. J '959 discloses blends of polycarbonate, polyorganohydrogen siloxane, titanium dioxide, epoxy functional grafted rubber and flame retardants. The reference discloses that flame retardants may be "an organic halogen system flame retarder, a sulfonic acid metal salt compound, a silicone system flame retarder". Specific sulfonic acid metal salts are not disclosed. Mark discloses polycarbonate compositions containing a metal salt of a monomeric or polymeric aromatic sulfonesulfonic acid as a flame retardant. The use of pigments is not disclosed. The Examiner has taken the position that "[I]t would have been obvious to choose any sulfonated salt flame retardant for use in the J `959 composition".

Applicants' Traversal

Applicants traverse the rejections and respectfully request reconsideration in view of the following discussion.

Claims 1, 4-13, 16-20, and 24 are not anticipated by Rosenquist et al. because the reference does not disclose all elements of the claims.

To Anticipate a Claim, the Reference Must Teach Every Element of the Claim

MPEP §2131 states the basic requirements for anticipation under 35 U.S.C. §102 citing relevant case law. As stated therein, "[T]he identical invention must be shown in as complete detail as is contained in the . . . claim."

Applicants submit that "about 2 parts" does not include 1.5 parts which is 25% less than 2 parts. Polycarbonate compositions having 1.5 parts by weight of titanium dioxide (per 100 parts polycarbonate) would not have sufficient reflectance to be used in a reflector or frame of an LCD. For example, J'959 requires a minimum of 5 parts of titanium dioxide in its disclosed polycarbonate compositions for use in liquid crystal displays. Therefore, a polycarbonate composition containing KSS and 1.5 pph titanium dioxide would not have the same properties as Applicants' claimed compositions which have sufficient reflectance for use in a reflector or frame of a backlight unit of a liquid crystal display.

New claims 25 and 27 are directed to an embodiment of the invention which does not contain brominated polycarbonate. Therefore, Applicants submit that these claims are not anticipated by Rosenquist et al. which require a brominated polycarbonate resin in their compositions.

The Examiner has not established a prima facie case of obviousness of claims 1 to 24 over the references cited against the claims.

Requirements For Prima Facie Case of Obviousness

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

(A) The claimed invention must be considered as a whole;

(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

MPEP §2143 states the basic requirements of a *prima facie* case of obviousness citing supporting case law:

1 There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art to modify the references or combine reference teachings. (see MPEP §2143.01)

2. There must be a reasonable expectation of success. (see MPEP §2143.02)

3. The prior art reference (or references when combined) must teach or suggest all of the claim limitations. (see MPEP §2143.03)

The fact that references can be modified or combined is *not* sufficient to establish *prima facie* obviousness. (MPEP §2143.01).

Differences Between the Prior Art and the Claimed Invention

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103(a) are set forth in set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966) and include determining the scope and contents of the prior art and ascertaining the differences between the prior art and the claims.

Rosenquist et al. teach away from the use of sulfone sulfonate salts in polycarbonate compositions which also include titanium dioxide.

Rosenquist et al. do not include sulfone sulfonate salts among the aromatic sulfonic acids used in their compositions. The example cited by the Examiner is a comparative example, not an example according to the invention. According to the reference, "Comparative Example A illustrates the effect of KSS, stabilizer and pigment on the charring and dripping properties of a polymer blend . . . .". Comparative example A uses KSS to show that it gives undesirable results compared to sodium 2,4,5-trichlorobenzenesulfonate, i.e., KSS does not prevent dripping. Therefore, Comparative example A is evidence that a sufone sulfonate does not give the same results as a non-sulfone sulfonate salt in polycarbonate compositions containing titanium dioxide.

In view of the undesirable results in Comparative example A, Applicants submit that the reference teaches *away* from the use of a sulfone sulfonate salt with titanium dioxide in polycarbonate compositions. Therefore, one skilled in the art would not be motivated to use KSS in the compositions of Rosenquist et al. or to adjust the amounts of KSS to the preferred amounts recited in claim 2.

There is no motivation to use titanium dioxide in the compositions of Ishii et al. in view of the undesirable results shown in Rosenquist et al. and no teaching of compatibility in Kirsch et al. or J-959.

Ishii et al. generally discloses the use of a number of additives including pigments but does not specifically name any pigments. It is noted that the reference specifically states that its compositions can contain such additives "so long as the additional component does not impair its physical properties . . ." (col. 7, lines 54-55). There is nothing in the reference that would motivate one skilled in the art to select a pigment from the list of possible additives let alone select titanium dioxide as the additive.

Comparative Example A of Rosenquist et al. shows that a sulfone sulfonate (KSS) produces undesirable results compared to the use of a sulfonic acid metal salt (sodium-2,4,5-

trichlorobenzene sulfonate) in a polycarbonate composition containing titanium dioxide. Therefore, one skilled in the art would not be motivated to use titanium dioxide as a pigment in Ishii et al. since evidence in Rosenquist et al. suggests that it would adversely affect the characteristics of a polycarbonate composition when used with a sulfone sulfonate such as KSS.

Kirsch et al. disclose the use of titanium dioxide in polycarbonate compositions but does not disclose the use of any type of sulfonic acid metal salts. Therefore, there is no teaching regarding the compatibility of titanium dioxide and sulfone sulfonic acid salts with polycarbonate compositions. Although J'959 teaches the known use of titanium dioxide in polycarbonate compositions, the reference does not teach the use of sulfone sulfonic acid metal salts specifically. The only relevant disclosure is the general teaching of aromatic sulfonic acid flame retardant. Therefore, J'959 does not disclose compatibility of titanium dioxide and sulfone sulfonic acid salts in polycarbonate compositions. There is nothing in either reference that teaches or suggests that the combined use of titanium dioxide and sulfone sulfonate salts would not degrade the properties of the polycarbonate composition.

In view of the disclosure of undesirable results in Rosenquist et al. and the lack of any teaching of compatibility in Kirsch et al. or J'959, Applicants submit that one skilled in the art would *not* be motivated to combine the references as proposed by the Examiner to use both a sulfone sulfonate salt and titanium dioxide in a polycarbonate composition.

There is no motivation to use titanium dioxide in the compositions of J'959 in view of the undesirable results shown in Rosenquist et al. and no teaching of compatibility in Mark et al.

Although J'959 teaches the known use of titanium dioxide in polycarbonate compositions, the reference does not teach the use of sulfone sulfonic acid metal salts specifically. The only relevant disclosure is the general teaching of aromatic sulfonic acid flame retardant. Therefore, J'959 does not disclose compatibility of titanium dioxide and sulfone sulfonic acid salts in polycarbonate compositions. Mark is limited to a disclosure of the use of sulfonesulfonic acid metal salts as flame retardants in polycarbonate since the use of pigments is not disclosed or suggested. Again, there is no teaching of any compatibility of titanium dioxide and sulfone sulfonic acid salts in polycarbonate compositions.

Comparative Example A of Rosenquist et al. shows that a sulfone sulfonate (KSS) gives undesirable results compared to the use of a sulfonic acid metal salt (sodium-2,4,5-trichlorobenzene sulfonate) in a polycarbonate composition containing titanium dioxide. Therefore, Applicants submit that one skilled in art would *not* be motivated to combine J'959 with Mark because of the adverse effects disclosed by Rosenquist et al. in polycarbonate compositions containing both a sulfone sulfonate salt and titanium dioxide.

The comparative example of Rosenquist et al. is evidence of lack of reasonable expectation of success in using a sulfone sulfonate metal salt together with titanium dioxide in the compositions of the primary references.

It is known in the art that the additives in polycarbonate compositions can result in degradation of the physical properties of the composition. There is no evidence in the record that indicates that a sulfone sulfonate and titanium dioxide could be added to a polycarbonate composition without degradation of the properties of the composition.

As discussed previously, Comparative example A of Rosenquist et al. shows that a sulfone sulfonate gives undesirable results when used with titanium dioxide in a polycarbonate composition. None of the other references cited by the Examiner teach or suggest compatibility between a sulfone sulfonate salt and titanium dioxide in polycarbonate compositions. Therefore, one skilled in the art would *not* have a reasonable expectation of success if the references were combined as proposed by the Examiner.

Applicants have produced polycarbonate compositions having good reflectance and pure white color by employing titanium dioxide and adding at least one sulfone sulfonate salt which prevents decrease in impact strength. These advantages are not taught or suggested by the references cited by the Examiner. As shown in Table 2 of the specification, the resin compositions which do not contain sulfone sulfonate salt show large drops in impact strength and much lower reflectances than the compositions according to the invention. The polycarbonate compositions according to the present invention have excellent light reflectance, good impact strength, and high fluidity and can be used in the reflector or frame of the backlight unit of liquid crystal displays for notebook computers, monitors, television sets, camcorders and digital

cameras. The resin composition is particularly useful for the production of a backlight frame of an LCD.

Applicants submit that a review of the prior art of record as a whole shows that the claims in the present application meet the requirements for patentability. It is respectfully requested that the Examiner reconsider his rejections of the claims and allow claims 1 to 28.

Respectfully submitted,

CHUNG ET AL

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VERSION SHOWING CHANGES IN THE SPECIFICATION AND CLAIMS

IN THE SPECIFICATION:

The paragraph beginning on page 4, line 26 has been amended as follows:

(B) Titanium Dioxide

Various types of titanium dioxide are known in the art. Titanium dioxide is classified into Anatase type and Rutile type depending on crystallization. Titanium dioxide is classified into various types depending on shape of particle, surface treating agent to be used and average size of particle. Any type of titanium dioxide can be used in the present invention. However, it is preferable to use Rutile type with a median particle size of about 0.15-0.25 μm to obtain good reflectance and mechanical properties.

The paragraph beginning on page 9, line 5 has been amended as follows:

(B) Titanium Dioxide

Rutile titanium dioxide with a median particle size of about 0.15 - 0.25 ~~mm~~ μm was used.

IN THE CLAIMS:

Claim 1(Once amended). A polycarbonate resin composition comprising: (A) about 100 parts by weight of a thermoplastic polycarbonate resin as a base resin, (B) about 2-20 parts by weight of titanium dioxide per 100 parts by weight of (A), and (C) about 0.01-5 parts by weight of a sulfone sulfonate salt per 100 parts by weight of (A).

Claim 3 (Once amended). The polycarbonate resin composition of claim 1 wherein said titanium dioxide is Rutile titanium dioxide with a median particle size of about 0.15-0.25 ~~mm~~ μm.